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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/877,145	06/11/2001	Itsuko Sakai	04329.2574	1279

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EXAMINER

TRAN, BINH X

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 05/21/2003

8

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/877,145

Applicant(s)

SAKAI ET AL.

Examiner

Binh X Tran

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 June 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) 18-31 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 1-7 and 10-17 is/are rejected.
- 7) ☐ Claim(s) 8 and 9 is/are objected to.
- 8) ☒ Claim(s) 1-31 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3,4
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Election/Restrictions

1. Applicant's election of Group I (claims 1-17) in Paper No. 6 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).
2. Claims 18-31 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 6.

Response to Amendment

3. The examiner acknowledges the Preliminary Amendment (Paper No. 7) filed on 3-26-2003 with respect to claims 18, 23, 26, 29. The Preliminary Amendment has been entered. However, the amended claims belong to the non-elected invention.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-7, 10-14, 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grimbergen et al. (US 6,406,924) and Nozawa et al. (US 6,224,667) in view of each other.

Grimbergen discloses plasma processing method comprising:

introducing a processing gas (36) into the chamber (Fig 2);

obtaining specified values by monitoring the state of the plasma of the process gas within the process chamber;

controlling (via gas flow controller 40) in gas flow so as to adjust a predetermined property value to a regulated value (Fig 2).

Grimbergen fails to disclose the step of re-circulate part of the process gas exhausted from the chamber into the chamber again. Nozawa teaches to re-circulate part of the process gas exhausted from the process chamber into the process chamber (Fig 1-2, col. 5 lines 1-35). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Grimbergen in view of Nozawa by re-circulate the exhausted gas because it will reduce the cost for the process gas.

Respect to claim 2, Nozawa discloses that the introducing condition of the process gas is controlled by changing the circulation ratio using gas mixing regulation device (G). Grimbergen discloses that the property value of the plasma depends on the gas flow rate and composition of each gas (col. 16 lines 42-67; col. 27 lines 32-35). Respect to claims 3-4, Nozawa discloses either controlling the flow rate of re-circulating gas (Fig 1 pipe G2 on the right) or newly introducing gas (Fig 1). Respect to claim 5, Grimbergen discloses the mixed gas can comprise at least two gas. Nozawa also discloses the mixed gas comprise at least two gas as well as controlling the flow rate of re-circulating gas and newly introduce gas.

Respect to claims 6, 11 both Nozawa and Grimbergen disclose a silicon film formed on the silicon substrate (Nozawa col. 6 lines 25-29; Grimbergen layer 24 on the

substrate). Nozawa and Grimbergen further disclose that the silicon oxide is processed using plasma. Since Nozawa teaches the circulating ratio is controlled or changed by gas mixing regulating device, the property of the plasma at the time before changing the circulating ratio must exist. The examiner certainly can interpret any property value of the plasma before changing the circulating ratio as the regulated value.

Respect to claims 7, 17 Nozawa discloses there is a valve for re-circulating gas before the gas mixing regulating device G (Fig 1). This valve can only be in either the "open" or "close" mode. If this valve is in the "close" mode, then the circulating ratio is zero. Further, the circulating ratio is a result effective variable. The result effective variable is commonly determined by routine experiment. The process of conducting routine experiments so as to produce an expected result is obvious to one of ordinary skill in the art.

Respect to claim 10, 16, Nozawa disclose the process gas exhausted from the chamber is re-circulated easily without changing the component of the process gas. The limitation of claims 12-14 has been discussed above.

6. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Grimbergen and Nozawa in view of Saito et al. (US 5,565,114).

Respect to claim 15, Grimbergen and Nozawa fail to disclose the property value represents the light emission intensity from CF₂ radicals. However, Nozawa clearly disclose the use of the gas mixture containing C and F (col. 6 lines 20-25). Saito discloses the use of C-F base gas as well as monitor the light emission of CF₂ (col. 16 lines 8-25). It would have been obvious to one having ordinary skill in the art, at the

time of invention, to modify Grimbergen and Nozawa in view of Saito by monitoring the light emission intensity of CF2 radicals because they can be detected by the photo-detector to determine the endpoint.

Allowable Subject Matter

7. Claims 8-9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

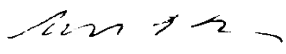
Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Binh X Tran whose telephone number is (703) 308-1867. The examiner can normally be reached on Monday-Thursday and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin L Utech can be reached on (703) 308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Binh X. Tran
May 15, 2003


BENJAMIN L. UTECH
SUPERVISORY PATENT EXAMINER
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